Canon ENGLISH

F-717SGA

Scientific Calculator

NOTES

Certain parts on the **F-717SGA** are made from recycled materials sourced from other Canon products which might lead to an uneven plastic colour.

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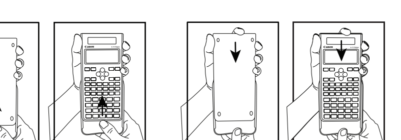
CONTENTS

How to use the Slide Cover

Open or close the cover by sliding as shown in the figure.



DISPLAY (4-line Dot Matrix Display)

```
S A M STO RCL STAT    D R G FIX SCI LINE   ▲▼ Disp
sin(π/4)+√2/2
                  1.414213562
```

<Status Indicators>

- S : Shift key
- A : Alpha key
- M : Independent memory
- STO : Store memory
- RCL : Recall memory
- STAT : Statistics mode
- D : Degree Mode
- R : Radian Mode
- G : Gradient Mode
- FIX : Fixed-decimal setting.
- SCI : Scientific Notation
- LINE : Line Display mode
- ▲ : Up Arrow
- ▼ : Down Arrow
- Disp : Multi-statements Display

GETTING STARTED

Power ON, OFF

■ **First time operation:**

1. Pull out the battery insulation sheet, then the battery will be loaded.
2. Press [ON] [SHIFT] [CLR] [3] [=] [CA] to reset the calculator.

Power ON: When [ON] is pressed.

Power OFF: [SHIFT] [OFF] are pressed.

■ **Auto Power off Function:**
When the calculator is not used for about **7 minutes**, it will automatically power off.

Display Contrast Adjustment

■ Press [SHIFT] [SET-UP] [▽] [5] (5: ◁ CONT ▷), enter the Display Contrast Adjustment screen.

```
CONTRAST
LIGHT        DARK
 [◀]          [▶]
```

Press ▷ to make the display contrast darken.
Press ◁ to make the display contrast lighten.
Press [CA] or [ON] to confirm and clear the screen.

■ To initialize the LCD contrast, press [SHIFT] [CLR] [3] [=] [CA] outside the **Display Contrast Adjustment** screen.

Mode Selection

■ Press [MODE] to enter the Calculation Mode Selection screen.
■ Press [1], [2] to select the calculation mode.

```
1:COMP   2:STAT
```


Operation	Mode		LCD Indicator
[MODE] [1]	COMP	Normal calculation	
[MODE] [2]	STAT	Statistical calculation	STAT

■ Initial mode is COMP mode.

Calculator Set-up Menu

■ Press [SHIFT] [SET-UP] to enter the **Calculator Set-up Menu**; press ▽ / △ for next / previous page.

```
1:MthIO 2:LineIO        1:ab/c  2:d/c
3:Deg   4:Rad     <-->  3:STAT  4:Disp
5:Gra   6:Fix           5:◀CONT▶
7:Sci   8:Norm
```

Press ▽ or △ key

■ **To select the calculator input & output format [1] MthIO or [2] LineIO**

[1] MthIO - (Maths mode). Most of the input (e.g. Fraction, pi, square root number) are shown in Mathematics textbook format.

Maths mode:
```
√5+1
3−1
        1.224744871
```

And there are two "Result Format" (MathO or LineO) for selection. In MathO, fraction calculation result will be shown same as Input. In Lineo, fraction calculation result will be in line format.

```
Result Format?
1:MathO 2:LineO
```

[2] LineIO – (Line mode): The majority of calculation input and output are shown in the lines format. And "LINE" icon will be shown.

Line mode:
```
√(5+1)⌟(3−1)          LINE
        1.224744871
```

For the STAT mode, the Input & Display format will switch to LineIO mode automatically.

■ **To select the angle unit [3] Deg, [4] Rad or [5] Gra**
[3] Deg: Angle unit in Degree
[4] Rad: Angle unit in Radian
[5] Gra: Angle unit in Gradient

$90° = \frac{\pi}{2}$ radians = 100grads

■ **To select display digit or notation [6] Fix, [7] Sci or [8] Norm**
[6] Fix: Fixed Decimal, [Fix 0~9?] appears, specify the number of decimal places by pressing [0] – [9].
Example: 220 ÷ 7 = 31.4286 (FIX 4)
= 31.43 (FIX 2)

[7] Sci: Scientific Notation, [Sci 0~9?] appears, specify the number of significant digits by pressing [0] – [9].
Example: 220 ÷ 7 = 3.1429×10^1 (SCI 5)
= 3.143×10^1 (SCI 4)

[8] Norm: Exponential Notation, [Norm 1~2?] appears, specify the exponential notation format by pressing [1] or [2].

Norm 1: Exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than <u>**TWO**</u> decimal points.

Norm 2: Exponential notation is automatically used for integer values with more than 10 digits and decimal values with more than <u>**NINE**</u> decimal places.

Example: 1 ÷ 1000 = 1×10^{-3} (Norm 1)
= 0.001 (Norm 2)

■ **To select the fraction format [1] a b/c or [2] d/c**
[1] a b/c: specify Mixed fraction display
[2] d/c: specify Improper fraction display

■ **To select the statistical display format [3] STAT ([1] ON or [2] OFF)**
[1] ON: Show FREQ (Frequency) Column in Statistical Data Input Screen
[2] OFF: Hide FREQ (Frequency) Column in Statistical Data Input Screen

■ **To select the decimal point display format [4] Disp ([1] Dot or [2] Comma)**
[1] Dot: specify dot format for Decimal point result display
[2] Comma: specify comma format for Decimal point result display

■ **To Adjust Display contrast [5] ◁ CONT ▷**
See "Display Contrast Adjustment" section.

Before Using the Calculator

■ **Check the current Calculation Mode**
Be sure to check the status indicators that indicate the current calculation mode (COMP, STAT), display formats setting and angle unit setting (Deg, Rad, Gra)

■ **Return to initial setup**
Pressing [SHIFT] [CLR] [1] (SET-UP) [=] (YES) [CA] to return the initial calculator setup

- Calculation mode : COMP
- Input/Output Format : MthIO/MathO
- Angle unit : Deg
- Display Digits : Norm 2
- Fraction Display Format : d/c
- Statistical Data Input : OFF
- Decimal Point format : Dot

This action will not clear the variable memories.

■ **Initialize the calculator**
When you are not sure of the current calculator setting, you are recommended to initialize the calculator (calculation mode "COMP", angle unit "Degree", and clear reply and variable memories), and LCD contrast by pressing [SHIFT] [CLR] [3] (All) [=] (YES) [CA].

INPUTTING EXPRESSIONS AND VALUES

Input Capacity

F-717SGA allows you to input a single calculation up to 99 bytes. Normally, one byte is used as each time you press one of the numeric keys, arithmetic keys, scientific function keys or [Ans]. Some functions require 4 – 13bytes. [SHIFT], [ALPHA], and the direction keys will not use up any bytes. When input capacity is less than 10bytes, the input cursor will change from " ❙ " to " █ " that notifying the memory is running now.

Input Editing

■ New Input begins on the left of display. If input data are more than 15 characters, the line will scroll to the right consecutively. You can scroll back to the left by using ◁ and ▷ to review the input

■ In LineIO mode, press △ to let the cursor jump to the beginning of inputting, while ▽ will jump to the end.

■ In MthIO mode, press ▷ to let the cursor jump to the beginning of inputting while it is at the end of the input calculation. Or press ◁ to let the cursor jump to the end of inputting while it is at the beginning of the input calculation.

■ Omit the multiplication sign and final close parenthesis.

Example: 2 x log 100 x (1+3) = 16

	Operation 1:	Display 1
Including [×] *1, [)] *2, [)] *3	[2] [×] [log] [1] [0] [0] [)] [×] [(] [1] [+] [3] [)] [=] (*1, *2, *3)	2xlog(100) x (1+3) 16
	Operation 2:	**Display 2**
Omitting [×] *1, Omitting [)] *3	[2] [log] [1] [0] [0] [)] [(] [1] [+] [3] [=]	2log(100)(1+3 16

*1. Omit multiplication sign (x)
- Input before an open parentheses [(] : 1 x (2+3)
- Input before scientific functions that includes parenthesis: 2 x cos(30)
- Input before Random number function [Rand]
- Input before Variable (A, B, C, D, X, Y, M), π, e

*2. Scientific functions come with the open parenthesis. Example: sin(, cos(, Pol(, You need to input the argument and the close parenthesis [)].

*3. Omit the last close parenthesis before the [=], [M+], [M-], [SHIFT] [STO].

■ **Insert and overwrite Input mode**
In LineIO mode, you can use INSERT [INS] or overwrite mode for inputting.
- In Insert mode (Default input mode), the cursor is a vertical flashing line " I " for inserting a new character.
- In overwrite mode, press [SHIFT] [INS] key to switch the cursor to a flashing horizontal (_) and replace the character at the current cursor position.

In MthIO mode, you can only use the insert mode.

Whenever the display format changes from LineIO mode to MthIO mode, it will automatically switch to the insert mode.

■ **Deleting and Correcting an Expression**
In insert mode: Move the cursor to the right of the character or function that needs to be deleted, then press [DEL].

In overwrite mode: Move the cursor under the character or function being deleted, then press [DEL].

Example: 1234567 + 889900

(1) Replace an entry (1234567 → 1234560)

Mode Setting	Key In operation	Display (input Line only)
Method 1: LineIO/MthIO mode - Insert mode	1234567 [+] 889900	1234567I+889900
	◁ 7 times	
	[DEL] [0]	1234560I+889900
Method 2: LineIO mode - Overwrite mode	[SHIFT] [SET-UP] [2]	1234567+889900_
	1234567 [+] 889900	
	[SHIFT] [INS]	
	◁ 8 times	123456<u>7</u>+889900
	[0]	1234560<u>+</u>889900

(2) Deletion (1234567 → 134567)

Method 1: LineIO/MthIO mode - Insert mode	◁ 12times	12I34567+889900
	[DEL]	134567+889900
Method 2: LineIO mode - Overwrite mode	[SHIFT] [INS]	1234567+889900_
	◁ 13times	1<u>2</u>34567+889900
	[DEL]	1<u>3</u>4567+889900

(3) Insertion (889900 → 2889900)

LineIO/MthIO mode - Insert mode	◁ 6times	1234567+I889900
	[2]	1234567+2I889900

Inputting and Display result in MthIO Mode

■ In MthIO Mode, the Input display of fraction or certain functions (log, x^2, x^3, $x^{■}$, √■, ∛■, ■√□, x^{-1}, $10^{■}$, $e^{■}$, Abs) is shown in Mathematics textbook format.

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$\left\lvert\sqrt{3}-\frac{2}{\sqrt{2}}\right\rvert$	[Abs] [√] [3] ▷ [−] [2] [▭/▭] [√] [2] [=]	$\left\lvert\sqrt{3}-\frac{2}{\sqrt{2}}\right\rvert$ 0.3178372452

Remark

1. Some input expressions cause the height of a calculation expression to be greater than one display screen. Maximum input capacity: 2 display screen (31 dots x 2).
2. Calculator memory limits how many functions or perentheses can be input in any single expression. In this case divide the expression into multiple parts and calculate separately.
3. If part of the expression you input is cut off after calculation and in the result display screen you can press ◁ or ▷ to view the full expression.

INPUT RANGE AND ERROR MESSAGE

Calculation Precision, Input Range

Number of Digits for Internal Calculation	Up to 18 digits
Precision*	±1 at the 10th digit for a single calculation. ±1 at the least significant for exponential display
Calculation Range	$\pm 1 \times 10^{-99}$ to $\pm 9.999999999 \times 10^{99}$ or 0

■ **Function Calculation Input Ranges**

Functions		Input Range
sinx	DEG	$0 \leqq \lvert x\rvert < 9\times10^9$
	RAD	$0 \leqq \lvert x\rvert < 157\,079\,632.7$
	GRA	$0 \leqq \lvert x\rvert < 1\times10^{10}$
cosx	DEG	$0 \leqq \lvert x\rvert < 9\times10^9$
	RAD	$0 \leqq \lvert x\rvert < 157\,079\,632.7$
	GRA	$0 \leqq \lvert x\rvert < 1\times10^{10}$
tanx	DEG	Same as sinx, except when lxl =(2n–1)×90
	RAD	Same as sinx, except when lxl =(2n–1)×π /2
	GRA	Same as sinx, except when lxl =(2n–1)×100
$\sin^{-1}x$		$0 \leqq \lvert x\rvert \leqq 1$
$\cos^{-1}x$		
$\tan^{-1}x$		$0 \leqq \lvert x\rvert \leqq 9.999\,999\,999\times10^{99}$
sinhx		$0 \leqq \lvert x\rvert \leqq 230.258\,509\,2$
coshx		
$\sinh^{-1}x$		$0 \leqq \lvert x\rvert \leqq 4.999\,999\,999\times10^{99}$
$\cosh^{-1}x$		$1 \leqq x \leqq 4.999\,999\,999\times10^{99}$
tanhx		$0 \leqq \lvert x\rvert \leqq 9.999\,999\,999\times10^{99}$
$\tanh^{-1}x$		$0 \leqq \lvert x\rvert \leqq 9.999\,999\,999\times10^{-1}$
logx/lnx		$0 < x \leqq 9.999\,999\,999\times10^{99}$
10^x		$-9.999\,999\,999\times10^{99} \leqq x \leqq 99.999\,999\,99$
e^x		$-9.999\,999\,999\times10^{99} \leqq x \leqq 230.258\,509\,2$
√x		$0 \leqq x < 1\times10^{100}$
x^2		$\lvert x\rvert < 1\times10^{50}$
x^3		$\lvert x\rvert \leqq 2.154\,434\,69\times10^{33}$
x^{-1}		$\lvert x\rvert < 1\times100^{100}, x \neq 0$
∛x		$\lvert x\rvert < 1\times10^{100}$
x!		$0 \leqq x \leqq 69$ (x is an integer)
nPr		$0 \leqq n < 1\times10^{10}$, $0 \leqq r \leqq n$ (n,r are integers)
		$1 \leqq \{n!/(n-r)!\} < 1\times10^{100}$
nCr		$0 \leqq n < 1\times10^{10}$, $0 \leqq r \leqq n$ (n,r are integers)
		$1 \leqq n!/r! < 1\times10^{100}$ or $1 \leqq n!/(n-r)! < 1\times10^{100}$

Functions	Input Range
Pol(x,y)	$\lvert x\rvert,\lvert y\rvert \leqq 9.999\,999\,999\times10^{99}$ $\sqrt{x^2+y^2} \leqq 9.999\,999\,999\times10^{99}$
Rec(r,θ)	$0 \leqq r \leqq 9.999\,999\,999\times10^{99}$ θ : Same as sinx
° ′ ″	$\lvert a\rvert,b,c < 1\times10^{100}$ $0 \leqq b,c$ The display seconds value is subject to an error of +/-1 at the second decimal place
← ° ′ ″	$\lvert x\rvert < 1\times10^{100}$ Deciaml ↔ Sexagesimal Conversions 0°0′0″ ≦ lxl ≦ 9999999°59′59″
$x^{■}$	$x>0$: $-1\times10^{100} < y\log x < 100$ $x=0$: $y>0$ $x<0$: $y=n, m/(2n+1)$ (m,n are integers) However: $-1\times10^{100} < y\log\lvert x\rvert < 100$
$^x\sqrt{y}$	$y>0$: $x \neq 0$, $-1\times10^{100} < 1/x \log y < 100$ $y=0$: $x>0$ $y<0$: $x=2n+1, (2n+1)/m$ ($m \neq 0$; m,n are integers) However: $-1\times10^{100} < (1/x)\log\lvert y\rvert < 100$
a b/c	Total of integer, numerator, and denominator must be 10 digits or less (including division marks).
RanInt#(a,b)	$0 \leqq a < 1\times10^{10}$, $0 \leqq b < 1\times10^{10}$ (a,b should be positive integers or 0)
Ran#	Result generates a 3 digits pseudo random number(0.000~0.999)
Abs	$\lvert x\rvert < 1\times10^{100}$
One-variable Statistical calculation	$\lvert x\rvert < 1\times10^{100}$ $\lvert FREQ\rvert < 1\times10^{100}$
Two-variable Statistical calculation	$\lvert x\rvert < 1\times10^{100}$ $\lvert y\rvert < 1\times10^{100}$ $\lvert FREQ\rvert < 1\times10^{100}$

- Errors are cumulative in the case of consecutive calculations, this is also true as internal consecutive calculation are performed in the case of $x^{■}$, $^x\sqrt{y}$, ∛, x!, nPr, nCr , etc. And may become large.

Order of Operations

This calculator will automatically determine the operation priority of each individual command as follows:-

1st Priority	Recall memory (A, B, C, D, X, Y, M), Ran#
2nd	Calculation within parentheses ( ).
3rd	Function with parenthesis that request the input argument to the right Pol(, Rec(, sin(, cos(, tan(, $\sin^{-1}$(, $\cos^{-1}$(, $\tan^{-1}$(, sinh(, cosh(, tanh(, $\sinh^{-1}$(, $\cosh^{-1}$(, $\tanh^{-1}$(, log(, ln(, e^(, 10^(,√(, ∛(, Abs(, Rnd(, RanInt#(
4th	Functions that come after the input value preceded by values, powers, power roots: x^2, x^3, x^{-1}, x!, ° ′ ″, °, r, g, ^(, $^x\sqrt{}$(, Percent %, $x10^X$
5th	Fractions: a b/c, d/c
6th	Prefix symbol: (–) (negative sign)
7th	Statistical estimated value calculation: x̂, ŷ, x̂1, x̂2
8th	Multiplication where sign is omitted: Multiplication sign omitted immediately before π, e, variables (2π, 5A, πA, etc.), functions with parentheses (2√(3), Asin(30), etc.)
9th	Permutations, combinations: nPr, nCr
10th	Multiplication and division: ×, ÷
11th	Addition and subtraction: +, –
12th	Calculation ending instruction: =, M+,M- STO(store memory)

■ In the same precedence level, calculations are performed from left to right.
■ Operation enclosed within parentheses is performed first. When a calculation contains an argument that is a negative number, the negative number must be enclosed within parentheses.

Example:
[(−)] [2] [x²] [=] $-2^2 = -4$
[(] [(−)] [2] [)] [x²] [=] $(-2)^2 = 4$

■ When same priority commands are mixed into one calculation.

Example 1:
[1] [÷] [2] [SHIFT] [π] [=] 1 ÷ 2π = 0.1591549431

Example 2:
[2] [SHIFT] [STO] [A] 2 → A
[1] [÷] [2] [ALPHA] [A] [=] $1 \div 2A = \frac{1}{4}$

Calculation Stacks

■ This calculator uses memory areas, called "stacks", to temporarily store numeric value (numbers) and commands (+, –, x…) according to their precedence during calculations.
■ The numeric stack has 10 levels and command stack has 128 levels. A stack error [Stack ERROR] occurs whenever you try to perform a calculation that exceeds the capacity of stacks.
■ Calculations are performed in sequence according to "Order of Operations". After the calculation is performed, the stored stack values will be released.

Error Messages and Error locator

The calculator is locked up while an error message is shown on the display to indicate the cause of the error.
■ Press [CA] to clear the error message, then return to the initial display of latest mode.
■ Press ◁ or ▷ to display input expression with the cursor positioned next to the error.
■ Press [ON] to clear the error message, clear the replay memory history and return to the initial display of the latest mode.

Error Message	Cause	Action
Math ERROR	• The intermediate or final result is outside the allowable calculation range. • An attempt to perform a calculation using a value that exceeds the allowable input range. • An attempt to perform an illogical operation (division by zero, etc.)	Check the input values and make sure they are all within the allowable ranges, Pay special attention to values in any using memory areas
Stack ERROR	• The capacity of the numeric stack or operator stack is exceeded.	• Simplify the calculation. • Divide the calculation into two or more separate parts.
Syntax ERROR	An attempt to perform an illegal mathematical operation.	Press ◁ or ▷ to display the cursor at the location of the error, make appropriate corrections
Insufficient MEM	The calculation result of Function Table mode parameters caused more than 30 x-values to be generated for a table	Narrow the table calculation range by changing the start, end, and step values, and try again.

BASIC CALCULATIONS

■ Press [MODE] [1] to enter COMP mode.
■ During the busy calculation, the calculator shows only the indicators (without any calculation result). You can press [CA] key to interrupt the calculating operation.

Arithmetic Calculations

- To calculate with negative values (exclude the negative exponent) enclose then with parentheses.
- This calculator supports 99 levels of parenthetical expression.

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$(-2.5)^2$	[(] [(−)] [2] [•] [5] [)] [x²] [=]	$(-2.5)^2$ $\frac{25}{4}$
$(4 \times 10^{75})(-2 \times 10^{-79})$	[4] [×10ˣ] [7] [5] [×] [(−)] [2] [×10ˣ] [(−)] [7] [9] [=]	$4_{x10}75x\text{-}2_{x10}\text{-}79$ $-\frac{1}{1250}$

Memory Calculations

Memory Variables

- There are 7 memory variables (A – D, M, X and Y), which store data, results, or dedicated values.
- Store values into memory by pressing [SHIFT] [STO] + Memory variable.
- Recall memory values by pressing [RCL] + Memory variable.
- Memory content can be cleared by pressing [0] [SHIFT] [STO] + Memory variable.

Example: 23 + 7 → A (30 store into A), calculate 2 sinA and clear memory A.

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
23 + 7 → A	[2] [3] [+] [7] [SHIFT] [STO] [A]	23+7→A 30
2 x sin A = 1	[2] [sin] [ALPHA] [A] [=]	2sin(A 1
Clear memory	[0] [SHIFT] [STO] [A]	0→A 0

Independent Memory

- Independent memory [M] uses the same memory area as variable M. It is convenient for calculating cumulative total by just pressing [M+] (add to memory) or [M-] (subtract from memory)
- Memory contents are retained even when the calculator is powered off.
- Clear independent memory (M) by pressing [0] [SHIFT] [STO] [M]
- Clear all memory values by pressing [SHIFT] [CLR] 2 (Clear Memory) [=] [CA]

Answer Memory

- The input values or the most recent calculation result will be automatically stored into Answer memory whenever you press [=], [SHIFT] [=], [M+], [SHIFT] [M-], [SHIFT] [STO]. Answer memory can hold up to 18 digits.
- Recall and use the latest stored Answer memory by pressing [Ans].
- Answer memory is not updated as an error operation had been performed.
- Answer memory contents can be maintained even if pressing [CA], changing the calculation mode, or turning off the calculator.

Example in MthIO & MathO mode	Key in operation	Display
123 + 456 → M+, Ans^2 = 335,241	[1] [2] [3] [+] [4] [5] [6] [M+] [x²] [=]	Ans^2 335241
789900 – Ans = 454,659	[7] [8] [9] [9] [0] [0] [−] [Ans] [=]	789900-Ans 454659

Fraction Calculations

The calculator supports Fraction calculation and the conversions between Fraction, Decimal point, Mixed fraction and Improper fraction.

- Specify the fraction calculation result display format by either **mixed fraction (■▭/▭)** or **improper fraction (▭/▭)** in set-up menu.
- At the default setting, fractions are displayed as improper fractions (▭/▭).
- Mixed Fraction display result only available after set the (■▭/▭) in the setup menu.

	Improper Fraction (▭/▭)	Mixed Fraction (■▭/▭)
MthIO Mode	$\frac{11}{3}$	$3\frac{2}{3}$
LineIO Mode	11_l3	3_l2_l3

■ Press [S↔D] to switch a <u>calculation result between fraction and decimal format</u>.
■ Press [SHIFT] [a b/c↔d/c] to switch a <u>calculation result between improper fraction and mixed fraction format</u>.
■ Result will be displayed in decimal format automatically whenever the total digit of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.
■ As a fraction calculation is mixed with decimal value, the result will be displayed by decimal format.
■ When fraction calculation in LineO and LineIO mode, the calculation result will be shown in decimal format.

Fraction ↔ Decimal point conversion

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$1\frac{1}{2}+\frac{5}{6}=\frac{7}{3}$	[1] [SHIFT] [■▭/▭] [1] ▷ [2] ▷ [+] [5] [▭/▭] [6] [=]	$1\frac{1}{2}+\frac{5}{6}$ $\frac{7}{3}$
$\frac{7}{3}$ ↔ 2.333333333 (Fraction ↔ Decimal)	[S↔D]	$1\frac{1}{2}+\frac{5}{6}$ 2.333333333
2.333333333 ↔ $2\frac{1}{3}$ (Decimal ↔ Mixed Fraction)	[SHIFT] [a b/c↔d/c]	$1\frac{1}{2}+\frac{5}{6}$ $2\frac{1}{3}$

Percentage Calculations

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
To calculate 25% of 820	[8] [2] [0] [×] [2] [5] [SHIFT] [%] [=]	820x25% 205
The percentage of 750 against 1250	[7] [5] [0] [÷] [1] [2] [5] [0] [SHIFT] [%] [=]	750÷1250% 60

Degree-Minutes-Seconds Calculations

Use degrees (hours), minutes and seconds key to perform a sexagesimal (base-60 notational system) calculation or convert the sexagesimal value into decimal value.

Degree-Minutes-seconds ↔ Decimal points

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
86°37′34.2″ ÷ 0.7 = 123°45′6″	[8] [6] [° ′ ″] [3] [7] [° ′ ″] [3] [4] [•] [2] [° ′ ″] [÷] [0] [•] [7] [=]	86°37 ° 34.2 ° ÷ 0.7 123°45′6″
123°45′6″ → 123.7516667	[° ′ ″]	86°37 ° 34.2 ° ÷ 0.7 123.7516667
2.3456 → 2°20′44.16″	[2] [•] [3] [4] [5] [6] [=] [° ′ ″]	2.3456 2°20′44.16″

Replay & Multi-statements

■ **Replay Memory Function**
- Replay memory is only available in COMP mode.
- After the calculation is executed, the calculation input and result will be stored in the replay memory automatically.
- Pressing [▼] (or [▲]) can replay the performed calculation input and result history.
- After obtaining the calculation result on the display, press [◄] or [►] to edit the input expression of that result.
- If the ▷ Indicator is on the right side of a calculation result display, you need to press [CA] and then [◄] or [►] to scroll the calculation.
- Replay memory is cleared when you press
  1. Initialize calculator setting by [SHIFT] [CLR] [3] [=] [CA]
  2. Change from one calculation mode or display mode to other.
  3. Press [ON] key.
  4. Press [SHIFT] [OFF] to power off machine.

■ **Multi-statements Function**
- Use a colon [:] to put two or more calculation input together.
- The first executed statement will have "Disp" indicator; and the "Disp" icon will disappeared after the last statement is being executed.

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
1x12=12 2+25=27 using a multi-statement	[1] [×] [1] [2] [ALPHA] [:] [2] [+] [2] [5]	1x12:2+25l
	[=]	▲ Disp 1x12 12
	[=]	▲ 2+25 27
Replay the previous calculation history 1 x 12 = 12	[▲]	▼ 1x12 12

FUNCTIONAL SCIENTIFIC CALCULATIONS

■ Press [MODE] [1] to enter COMP mode.
■ π = 3.14159265358979323
■ e = 2.71828182845904523

Square, Root, Cube, Cube Root, Power, Power Root, Reciprocal and Pi

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$\left(\sqrt[3]{2^2+5^3}\right)^{-1}\times\pi$ = 0.6217559776	[(] [SHIFT] [∛] [2] [x^2] [+] [5] [x^3] [►] [)] [x^{-1}] [×] [SHIFT] [π] [=]	$\left(\sqrt[3]{2^2+5^3}\right)^{-1}\times\pi$ 0.6217559776
$\left(\sqrt[3]{2^6}+\sqrt[5]{243}\right)$ = 7	[(] [SHIFT] [∛] [2] [$x^■$] [6] [►] [►] [+] [SHIFT] [ⁿ√] [5] [►] [2] [4] [3] [►] [)] [=]	$\left(\sqrt[3]{2^6}+\sqrt[5]{243}\right)$ 7

Logarithm, Natural logarithm and Antilogarithm

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$e^{-3}+10^{1.2}+\ln 3$ = 16.99733128	[SHIFT] [$e^■$] [(−)] [3] [►] [+] [SHIFT] [$10^■$] [1] [•] [2] [►] [+] [ln] [3] [=]	$e^{-3}+10^{1.2}+\ln(3$ 16.99733128

Angle Unit Conversion

The calculator angle unit setting is "Degree". Pressing [SHIFT] [SET-UP] enter the setup menu to change the unit to "Radian" or "Gradient",:

```
1:MthIO 2:LineIO
3:Deg   4:Rad
5:Gra   6:Fix
7:Sci   8:Norm
```

Press the corresponding number key [3], [4] or [5] for the angle unit you need. Then the display will show the D, R, G Indicator accordingly.

Convert an angle unit between "Degree", "Radian" and "Gradient" by pressing [SHIFT] [DRG►]

```
1:°     2:r
3:g
```

Then, pressing [1], [2], or [3] will convert the displayed value into the selected angle unit.

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
Convert 180 degree into radian and gradient (180° = π^{Rad} = 200^{Gad})	[SHIFT] [SET-UP] [4] [1] [8] [0] [SHIFT] [DRG►] [1] [=]	R 180° 3.141592654
	[SHIFT] [SET-UP] [5] [=]	180° 200

Trigonometry Calculations

■ Before using the trigonometric functions (except hyperbolic calculations), select the appropriate angle unit (Deg/Rad/Gra) by pressing [SHIFT] [SET-UP].

Angle Unit Setting	Angle Value Input	Input Value Range for form result
Deg	Units of 15°	$\lvert\pi\rvert < 9\times10^9$
Rad	Multiples of $\frac{1}{12}\pi$ radians	$\lvert\pi\rvert < 20\pi$
Gra	Multiples of $\frac{50}{3}$ grads	$\lvert\pi\rvert < 10000$

■ 90° = $\frac{\pi}{2}$ Radians = 100 Gradients.

Example in MthIO & MathO mode	Key in operation	Display
Degree Mode	[SHIFT] [SET-UP] [3]	D
sin 60 = 0.8660254038	[sin] [6] [0] [=]	sin(60 0.8660254038
$\frac{1}{Sin45°}$ =Cosec 45° = 1.414213562	[sin] [4] [5] [)] [x^{-1}] [=]	sin(45)⁻¹ 1.414213562

■ Hyperbolic (sinh/ cosh/ tanh), Inverse Hyperbolic ($\sinh^{-1}$/$\cosh^{-1}$/$\tanh^{-1}$) functions
■ Pressing [hyp] enter sub-hyperbolic menu.

```
1:sinh  2:cosh
3:tanh  4:sinh-1
5:cosh-1 6:tanh-1
```

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
sinh2.5 – cosh 2.5 = -0.08208499862	[hyp] [1] [2] [•] [5] [)] [−] [hyp] [2] [2] [•] [5] [)] [=]	sinh(2.5)-cosh(▷ -0.08208499862
$\cosh^{-1}45$ = 4.499686191	[hyp] [5] [4] [5] [=]	cosh⁻¹(45 4.499686191

Permutation, Combination, Factorials and Random Number Generation

■ Permutation: $nPr = \frac{n!}{(n-r)!}$

■ Combination: $nCr = \frac{n!}{r!(n-r)!}$

■ Factorial: $x! = x(x-1)(x-2)\ldots(2)(1)$

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$_{10}P_3$ = 720	[1] [0] [SHIFT] [nPr] [3] [=]	10P3 720
$_5C_2$ = 10	[5] [SHIFT] [nCr] [2] [=]	5C2 10
5! = 120	[5] [x!] [=]	5! 120

■ **Random Number Generation**

[SHIFT] [Ran#] : Generate a random number between 0.000 and 0.999. And the display result will be fraction format in Maths mode status.

[ALPHA] [RanInt] : Generate a random number between two specified positive integers. The entry is divided by ","

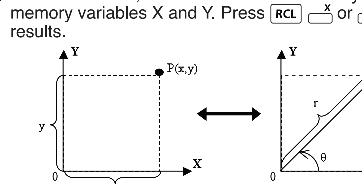
MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
Generate a random number between 0.000 & 0.999	[SHIFT] [Ran#] [=]	Ran# $\frac{283}{500}$
Generate an integer from range of 1 to 100	[ALPHA] [RanInt] [1] [SHIFT] [,] [1] [0] [0] [=]	RanInt#(1,100 81

*The value is only a sample, results will differ each time.

Coordinate Conversion

■ With polar coordinates, you can calculate and Display θ within –180° < θ ≤ 180° range. (Same as Radian and Gradient)
■ In Maths mode, press [◄] or [►] to scroll the calculation result.
■ In Line mode, (x,y) or (r, θ) will be shown over 2 line.
■ After conversion, the results will automatically be assigned to memory variables X and Y. Press [RCL] [X] or [Y] to show the results.



Rectangular Coordinates (Rec)   Polar Coordinates (Pol)

[SHIFT] [Pol] : Convert rectangular coordinates (x, y) to polar coordinates (r, θ); Press [RCL] [X] for r, or [RCL] [Y] for θ.

Example in MthIO & MathO mode	Key in operation	Display
With rectangular coordinate (x=1, y=√3). Find Polar coordinate (r, θ) at degree mode	[SHIFT] [Pol] [1] [SHIFT] [,] [√■] [3] [=]	Pol(1,√3 r=2,θ=60
	[RCL] [X]	X 2
	[RCL] [Y]	Y 60

[SHIFT] [Rec] : Convert polar coordinates (r, θ) to rectangular coordinates (x, y); Press [RCL] [X] for x, or [RCL] [Y] for y.

LineIO MODE : [SHIFT] [SET-UP] [2]

Example in LineIO mode	Key in operation	Display
With Polar coordinate (r=2, θ=60°). Find Rectangular coordinate (x, y) at degree mode	[SHIFT] [Rec] [2] [SHIFT] [,] [6] [0] [=]	Rec(2,60 X= 1 Y= 1.732050808
	[RCL] [X]	X 1
	[RCL] [Y]	Y 1.732050808

Absolute Value Calculation

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$\lvert\sin(60-5)\times(-\pi)\rvert$ =2.573442045	[Abs] [sin] [6] [0] [−] [5] [)] [×] [(] [(−)] [SHIFT] [π] [)] [=]	$\lvert\sin(60-5)\times(-\pi)\rvert$ 2.573442045

Engineering Notation

LineIO MODE : [SHIFT] [SET-UP] [2]

Example in LineIO mode	Key in operation	Display
1÷200 = 5×10^{-3}	[1] [÷] [2] [0] [0] [=] [ENG]	1÷200 5×10^{-3}
	[ENG]	1÷200 5000×10^{-6}
	[SHIFT] [←]	1÷200 5×10^{-3}

Display Values Exchange

■ In MathIO and LineIO mode, pressing [S↔D] to change the calculation result value between fraction form ↔ Decimal form, the other pi and Square root calculation will display a decimal value only.

LineIO MODE : [SHIFT] [SET-UP] [2]

Example in LineIO mode	Key in operation	Display
$\frac{2}{3}+2=\frac{8}{3}=2.666666667$	[2] [▭/▭] [3] [+] [2] [=]	2_l3+2 8_l3
	[S↔D]	2_l3+2 2.666666667

MthIO & MathO MODE : [SHIFT] [SET-UP] [1] [1]

Example in MthIO & MathO mode	Key in operation	Display
$\frac{2}{3}+2=\frac{8}{3}=2.666666667$	[2] [▭/▭] [3] [►] [+] [2] [=]	$\frac{2}{3}$+2 $\frac{8}{3}$
	[S↔D]	$\frac{2}{3}$+2 2.666666667

REMARK
- Some Calculation results, pressing [S↔D] key will not convert the display value.
- Some display result conversion may take a long time.

STATISTICAL CALCULATIONS

■ Press [MODE] [2] to enter Statistical calculation mode and "STAT" indicator lights up.
■ Press [SHIFT] [STAT] [1] (Type) to select the calculation type.

Statistical Type Selection

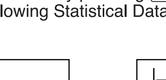
There are 8 types of Statistical Calculation, after entered the **Statistical Type Selection** screen, then press the number to select the type of Statistic Calculation.

```
1:1-VAR 2:A+BX
3:_+CX2 4:ln X
5:e^X   6:A•B^X
7:A•X^B 8:1/X
```

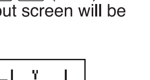
Pressing Key	Statistical Calculation
1 (1-VAR)	One-variable statistics (x)
2 (A+Bx)	Two-variable, Linear regression (y= A+Bx)
3 (_+Cx²)	Two-variable, Quadratic regression (y=A +Bx + Cx²)
4 (ln x)	Two-variable, Logarithmic regression (y=AxBlnx)
5 (e^x)	Two-variable, E exponential regression (y=Ae^Bx)
6 (A · B^x)	Two-variable, ab Exponential regression (y=AB^x)
7 (A · x^B)	Two-variable, Power regression (y=Ax^B)
8 (1/X)	Two-variable, Inverse regression (Y=A+B/x)

Statistical Data Input

After confirmed the calculation type of the above **Statistical Type Selection** screen or by pressing [SHIFT] [STAT] [2] (Data) in the STAT mode, the following Statistical Data Input screen will be shown.



1-variable STAT



2-variable STAT

- After turned on Data Frequency "FREQ" in calculator's setup menu, the FREQ column will be added into the above screen.
- The followings are the maximum number of line for data input.

Statistic type	FREQ ON	FREQ OFF
Single Variable (only x input)	40	80
2 Variable (x & y input)	26	40

- Input expression and display result value in **Statistical Data Input** screen are in Line mode (same as Comp mode with Line mode status).
- After inputted the data, then press [=] to store the value into statistical registers and display the value (max. 6 digits) in the cell. And you can press cursor key to move the cursor between each cell.

Editing Statistical Sample Data

■ **Replacing the Data in a cell**
(1) In Statistical Data Input screen, move the cursor to cell you want to edit.
(2) Input the new data value or expression, and then press [=]

■ **Deleting a line**
(1) In Statistical Data Input screen, move the cursor to line you want to delete.
(2) Press [DEL]

■ **Inserting a line**
(1) In Statistical Data Input screen, move the cursor to the line that will be under the line being inserted.
(2) Press [SHIFT] [STAT] [3] (Edit)
(3) Press [1] [INS]

■ **Deleting All STAT Data Input**
(1) Press [SHIFT] [STAT] [3] (Edit)
(2) Press [2] (Del-A)

Statistical Calculation Screen

■ After inputting the STAT Data, press [CA] to enter **Statistical Calculation** screen.
■ **Statistical Calculation** screen are in Line mode for input & output Display
■ Use **Statistical Menu** to calculate the Statistical result. (Sum, Var, MinMax, Reg).

Statistical Menu

In **Statistical Calculation** screen, you can press [SHIFT] [STAT] to display the **Statistical Menu** screen.

```
1:Type   2:Data
3:Sum    4:Var
5:MinMax
```

1-variable STAT

```
1:Type   2:Data
3:Sum    4:Var
5:Reg    6:MinMax
```

2-variable STAT

STAT items	Description
1: Type	To enter the statistical calculation type screen
2: Data	To enter the statistical Data input screen
3: SUM	To enter Sum sub-menu (calculating sum)
4: VAR	To enter Var sub-menu (calculating variable)
5: MinMax (1-Var)	To enter MinMax sub-menu (calculating Min & Max points)
6: MinMax (2-Var)	
7: Reg (2-Var only)	To enter Reg sub-menu (Regression calculation)

Statistical calculation result in Sum, Var, MinMax, Reg

STAT sub-menu	STAT Type	Value	Symbol	Operation
Sum	1 & 2 variable STAT	Summation of all x² value	∑x²	[SHIFT] [STAT] [3] [1]
		Summation of all x value	∑x	[SHIFT] [STAT] [3] [2]
	2-variable STAT only	Summation of all y² value	∑y²	[SHIFT] [STAT] [3] [3]
		Summation of all y value	∑y	[SHIFT] [STAT] [3] [4]
		Summation of xy pairs	∑xy	[SHIFT] [STAT] [3] [5]
		Summation of all x³ value	∑x³	[SHIFT] [STAT] [3] [6]
		Summation of all x²y pairs	∑x²y	[SHIFT] [STAT] [3] [7]
		Summation of all x⁴ pairs	∑x⁴	[SHIFT] [STAT] [3] [8]
Var	1 & 2 variable STAT	Number of data sample	n	[SHIFT] [STAT] [4] [1]
		Mean of the x values	$\bar{x}$	[SHIFT] [STAT] [4] [2]
		Population standard deviation of x	$x\sigma_n$	[SHIFT] [STAT] [4] [3]
		Sample sstandard deviation of x	$x\sigma_{n-1}$	[SHIFT] [STAT] [4] [4]
	2-variable STAT only	Mean of the y values	$\bar{y}$	[SHIFT] [STAT] [4] [5]
		Population standard deviation of y	$y\sigma_n$	[SHIFT] [STAT] [4] [6]
		Sample standard deviation of y	$y\sigma_{n-1}$	[SHIFT] [STAT] [4] [7]
MinMax (1-Var: [SHIFT] [STAT] 5)	1 or 2 variable STAT	Minimum value of X	minX	[SHIFT] [STAT] [5] [1]
		Maximum value of X	maxX	[SHIFT] [STAT] [5] [2]
(2-Var: [SHIFT] [STAT] 6)	2-variable STAT only	Minimum value of Y	minY	[SHIFT] [STAT] [6] [3]
		Maximum value of Y	maxY	[SHIFT] [STAT] [6] [4]
Reg	For non-Quad Reg	Regression coefficient A	A	[SHIFT] [STAT] [5] [1]
		Regression coefficient B	B	[SHIFT] [STAT] [5] [2]
		Correlation coefficient r	r	[SHIFT] [STAT] [5] [3]
		Estimated value of x	$\hat{x}$	[SHIFT] [STAT] [5] [4]
		Estimated value of y	$\hat{y}$	[SHIFT] [STAT] [5] [5]
Reg	For Quad Reg only	Regression coefficient A	A	[SHIFT] [STAT] [5] [1]
		Regression coefficient B	B	[SHIFT] [STAT] [5] [2]
		Regression coefficient C	C	[SHIFT] [STAT] [5] [3]
		Correlation coefficient r	r	[SHIFT] [STAT] [5] [4]
		Estimated value of x1	$\hat{x}1$	[SHIFT] [STAT] [5] [5]
		Estimated value of x2	$\hat{x}2$	[SHIFT] [STAT] [5] [6]
		Estimated value of y	$\hat{y}$	[SHIFT] [STAT] [6] [7]

Statistical Calculation Example

1-Var mode Example: To calculate ∑x², ∑x, n, $\bar{x}$, σx, Sx, minX, maxX of data: 75, 85, 90, 77, 79 in 1-Var mode (Freq: OFF)

Key in operation	Display
[MODE] [2]	1:1-VAR 2:A+BX 3:_+CX2 4:ln X 5:e^X 6:A•B^X 7:A•X^B 8:1/X
[1] (1-VAR)	X
[7] [5] [=] [8] [5] [=] [9] [0] [=] [7] [7] [=] [7] [9] [=]	X 77 79
[CA] [SHIFT] [STAT] [3] [1] [=]	∑x² 33120
[CA] [SHIFT] [STAT] [3] [2] [=]	∑x 406
[CA] [SHIFT] [STAT] [4] [1] [=]	n 5
[CA] [SHIFT] [STAT] [4] [2] [=]	$\bar{x}$ 81.2
[CA] [SHIFT] [STAT] [4] [3] [=]	σx 5.528109984
[CA] [SHIFT] [STAT] [4] [4] [=]	Sx 6.180614856
[CA] [SHIFT] [STAT] [5] [1] [=]	minX 75
[CA] [SHIFT] [STAT] [5] [2] [=]	maxX 90

Quadratic Regression type Statistical Calculation
Example: ABC Company investigate the effectiveness of the advertisement expense in coded units, the following data were obtained:

Advertisement expenses: X	18	35	40	21	19
Effectiveness: y (%)	38	54	59	40	38

Please use the regression to estimate the effectiveness (estimate the value of y) if the advertisement expenses X=30, and estimate the advertisement expenses level (estimate the value of X_1, X_2) for effectiveness y = 50.

Key in operation	Display
[MODE] [2]	1:1-VAR 2:A+BX 3:_+CX2 4:ln X 5:e^X 6:A•B^X 7:A•X^B 8:1/X
[3] (_+Cx²)	X Y
[1] [8] [=] [3] [5] [=] [4] [0] [=] [2] [1] [=] [1] [9] [=] [▼] [►] [3] [8] [=] [5] [4] [=] [5] [9] [=] [4] [0] [=] [3] [8] [=]	X 21 19 Y 40 38
[CA] [3] [0] [SHIFT] [STAT] [5] [6] [=]	30$\hat{y}$ 48.69615715
[CA] [5] [0] [SHIFT] [STAT] [5] [4] [=]	50$\hat{x}_1$ 31.30538226
[CA] [5] [0] [SHIFT] [STAT] [5] [5] [=]	50$\hat{x}_2$ -167.1096731

BATTERY REPLACEMENT

When the display characters are dim or show the follow message on the screen, turn the calculator off and replace the lithium battery immediately.

LOW BATTERY

Please replace the lithium battery using the following procedures,
1. Press [SHIFT] [OFF] to power off the calculator.
2. Remove the screw that securely fixes the battery cover in place.
3. Remove battery cover.
4. Remove the old battery with ball pen or similar sharp object.
5. Load the new battery with positive "+" side facing up.
6. Replace the battery cover, screw, and press [ON], [SHIFT] [CLR] [3] [=] [CA] to initialize the calculator.

Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used battery according to the instruction.

■ Electromagnetic interference or electrostatic discharge may cause the display to malfunction or the contents of the memory to be lost or altered. Should this occur, press [ON], [SHIFT] [CLR] [3] [=] [CA] to restart the calculator.

ADVICE AND PRECAUTIONS

- This calculator contains precision components such as LSI chips and should not be used in place subject to rapid variations in temperature, excessive humidity dirt or dust, or exposed to direct sunlight.
- The liquid crystal display panel is made of glass and should not be subjected to excessive pressure.
- When cleaning the device do not use a damp cloth or volatile liquid such as paint thinner. Instead, use only a soft, dry cloth.
- Do not under any circumstances dismantle his device. If you believe that the calculator is not functioning properly, either bring or mail the device together with the guarantee to service representative of Canon Business office.
- Never dispose the calculator improperly such as burning; it can create risks of personal injury or harm. You are suggested to dispose this product according to your national law.
- Do replace the battery once very two years even it is not used frequently.

Battery Caution!
- Keep the Battery out of reach of children. If the battery is swallowed, contact a doctor immediately.
- Misuse of battery may cause leakage, explosion, damages or personal injury.
- Don't recharge or disassemble the battery, it could cause a short circuit.
- Never expose the battery to high temperatures, direct heat, or dispose by incineration.
- Never leave a dead battery in the calculator as the dead battery may leak and cause damage to the calculator.
- Continue using the calculator in the low battery condition may have improper operation or the stored memory may be corrupted or lost completely. Keep the written records of important data all the time; and replace the battery as soon as possible.

SPECIFICATIONS

Power Supply : Single Lithium battery (CR2032 x 1)
Power Consumption : DC 3.0V / 0.3mW
Battery Life : Approximately 3 years
(Base on 1 hour operation per day)
Auto power off : Approx. **7 minutes**
Usable Temperature : 0° ~ 40°C (32°F ~ 104°F)
Size: 171 (L) × 86 (W) × 18.75 (H) mm (with cover) /
6-47/64" × 3-25/64" × 47/64" (with cover) /
168 (L) × 80 (W) × 14.5 (H) mm (without cover) /
6-19/64" × 3-5/32" × 37/64" (without cover)
Weight: 131 g (4.62 oz) (with cover) /
94.59 g (3.33 oz) (without cover)
*Specifications are subject to change without notice.

MEMO

MEMO

CANON ELECTRONIC BUSINESS MACHINES (H.K.) CO., LTD.
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